

Instantania, the fast, parallelized traffic microsimulator for large scale transport digital twins



Joerg Schweizer and Benyamin Heidary
University of Bologna, Italy



<https://instantania.wixsite.com/instantania>

Instantania is a microscopic transport microsimulator that can simulate one day of all vehicle movements in a medium size city within seconds. This leap in computing speed is possible by a massive parallelization of computing processes using graphics processing units (GPUs)

Feature list:

- lane-based network
- Network and demand generation with SUMO/hybridPy ecosystem
- different vehicle types (car, trucks, vans, bikes, motorcycles)
- vehicle following (currently IDM)
- static traffic lights
- lane change model: vehicles can change lanes at nodes only
- intersection model: vehicles jump over intersection if there is sufficient space on the successive lane, otherwise stop instantly

Current limitations (future developments):

- no pedestrians and plans
- simple traffic lights
- no sub-lane model (no overtaking of bikes on same lane)
- simplified lane change model, no overtaking
- simplified intersection model

